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GLOSSARY OF TERMS RELATING TO COPPER AND COPPER ALLOYS

PART 7 DIMENSIONAL SURFACE AND STRUCTURAL CHARACTERISTICS

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GLOSSARY OF TERMS RELATING TO COPPER AND COPPER ALLOYS

PART 7 DIMENSIONAL SURFACE AND STRUCTURAL CHARACTERISTICS

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GLOSSARY OF TERMS RELATING TO COPPER AND COPPER ALLOYS

PART 7 DIMENSIONAL SURFACE AND STRUCTURAL CHARACTERISTICS

0. FOREWORD

0.1 This Indian Standard (Part 7) was adopted by the Indian Standards Institution on 25 November 1986, after the draft finalized by the Copper and Copper Alloys Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 IS : 3288 (Part 1) covering terms for cast form and wrought form (main) was first published in 1965 and subsequently revised in 1973 and 1981. While reviewing the standard, the Sectional Committee decided to revise Part 1 and issue 7 more parts for making glossary more comprehensive by modifying the definition of several terms and by including many more terms commonly used in Copper industry. The parts are:

Part 1	Material (*third revision*)
Part 2	Unwrought and cast form
Part 3	Wrought form
Part 4	Processing
Part 5	Heat treatment
Part 6	Finishes
Part 7	Dimensional surfaces and structural characteristics
Part 8	Packing

0.3 This standard is intended mainly to cover technical definitions of terms relating to copper and copper alloys, and it does not necessarily include all the legal meanings of the terms. It is hoped that this standard will help in establishing a generally recognized usage for various terms encountered in the copper industry and eliminate any confusion which may sometimes arise due to individual interpretation of terms used in industry.

0.4 In the preparation of this standard, assistance has been derived from the following:

1)	ISO 197	Copper and copper alloys — Terms and definitions	
	ISO 197/1-1983	Part 1	Materials
	ISO 197/2-1983	Part 2	Unwrought products (Refinery shapes)
	ISO 197/3-1983	Part 3	Wrought products
	ISO 197/4-1983	Part 4	Castings
	ISO 197/5-1980	Part 5	Methods of processing and treatment

issued by the International Organization for Standardization (ISO).

2) BS 1420 : 1965 'Glossary of terms applicable to wrought products in copper, zinc and their alloys', issued by the British Standards Institution.

1. SCOPE

1.1 This standard (Part 7) defines the terms used in dimensional surfaces and structural characteristics in the field of copper and copper alloys.

2. DIMENSIONAL, SURFACE AND STRUCTURAL CHARACTERISTICS TERMS AND DEFINITIONS

2.1 Buckle (Spout) — Alternate bulges and hollows recurring along the central portion of a rolled product with the edges remaining relatively flat.

2.2 Burr — The ragged thin ridge of metal which may be left by a cutting operation, such as slitting, shearing or sawing.

2.3 Chatter Marks — Regularly spaced superficial transverse markings produced by vibration between the metal and the tools during fabrication.

2.4 Concavity — An inward curvature across the width of a surface of a rolled, extruded or drawn product.

2.5 Corner Radius — The radius of an arc to which adjacent sides of a product are tangential.

2.6 Deburred Product — A product from which the burr has been removed.

2.7 Die Lines — Longitudinal grooves or ridges on the surface of extruded or drawn products.

2.8 Directionality — A condition of the metal which causes the properties in the direction of working to differ from those at an angle to this direction.

2.9 Dish — A concavity across the full width or diameter of a product.

2.10 Double Skin (Skin Pipe) — A defect at or just below the surface of an extruded product, ranging in severity from slight blistering to complete separation of the peripheral layer.

2.11 Earing — Wavy projections around the rim of a deep drawn product.

2.12 Eccentricity — The shift of the centre line of the outer and the inner cross-section.

2.13 Edgewise Curvature (Edgewise Bow) — The laterial department of an edge of a flat product from a straight line joining two specified points on that edge.

2.14 Equivalent Round — The circular tube which has the same wall thickness as the average wall thickness of the tube under consideration and the same weight per linear foot.

2.15 Exact Length — Specified lengths subject to standard tolerances.

2.16 Fin — A thin longitudinal rib of metal formed during drawing or rolling through grooved rolls.

2.17 Flash — A thin flange of excess metal squeezed out between the die faces in the production of a forging.

2.18 Flash Line (Parting Line) — The line remaining on a forging after removal of flash and corresponding to the plane of contact between the dies.

2.19 Flatness — The extent to which the surface of a product approaches a plane.

2.20 Flow Lines — Evidence of the direction of grain flow as revealed on a polished and etched section of the metal.

2.21 Gassed Copper (Hydrogen Embrittled) — Copper which has become less ductile after heating in a reducing atmosphere containing hydrogen.

2.22 Gauge Number — A number in a specific series (which must be named, for example, standard wire gauge (SWG) used to designate a dimension.

2.23 Grain Flow — Elongation of the grains in the direction of working.

2.24 Grain Size — The average grain diameter expressed in millimetres.

2.25 Guide Marks — Longitudinal scratches on a product resulting from abrassion between the metal and the guides used to ensure its correct location during working processes.

2.26 Inclusion — Foreign matter entrapped within the metal.

2.27 Kink — A localized deviation from an intended plane.

2.28 Lap — A drawn-in or rolled-in fin.

2.29 Lamination — A plane of discontinuity with in the metal.

2.30 Mean Diameter — Half the sum of two diameters at right angles at any one cross-section.

2.31 Mean Wall Thickness — Half the sum of two wall thicknesses at points diametrically opposite to each other at any one cross-section of a tube.

2.32 Middle — The maximum difference in thickness across a flat product from edge to centre.

2.33 Multiple Lengths — Any integral multiple of a given length with suitable allowance for cutting, if any specified.

2.34 Orange Peel Surface — The surface roughness resulting from grain size defects during working.

2.35 Out of Roundness (Ovality) — The departure of the cross-section of a round tube, rod or wire from a circle.

If

c = maximum diameter,

d = minimum diameter, and

m = mean diameter,

Then $c - d$ = out-of-roundness

and $\frac{c - d \times 100}{m}$ = percent out-of-roundness.

2.36 Piping (Extruded Defects) — An internal defect usually at the back-end of an extruded product ranging from oxide inclusions and porosity to a discrete cavity.

2.37 Plug Lines — Longitudinal grooves or ridges on the inner surface of a cold drawn tube.

2.38 Random Lengths (Mill Lengths) — Any lengths at the supplier's discretion.

2.39 Reeling Marks — Superficial helical marks on round, extruded, drawn or rolled products which have been finally straightened by reeling.

2.40 Residual Stress (Internal Stress) — Any stress remaining within a wrought product.

2.41 Ripple — A slight undulation repeated at intervals along the length of a flat product.

2.42 Roll Marks — Surface defects in a rolled product repeated at regular intervals and caused by an imperfection at the roll surface.

2.43 Season Cracking — The formation of cracks by the combined action of corrosion and residual stress.

2.44 Spill (Sliver) — A tongue or partially detached film of the parent metal on the surface of a product.

2.45 Stock Lengths — Certain preferred lengths available in mill and warehouse stocks.

2.46 Straightness — The extent to which the axis or the edge of a product approaches a straight line.

2.47 Stress Corrosion Cracking — The formation of cracks by the combined action of corrosion and residual or applied stress.

2.48 Tolerance — An allowable deviation from specified characteristics, such as dimensions, chemical composition and mechanical properties.

2.49 Waviness — Alternate bulges and hollows recurring along the edge of a rolled product with the centre remaining relatively flats.

2.50 Wedge Taper — The difference in thickness across a flat product from edge-to-edge.

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